## Molecular epidemiology of simian malaria causing zoonosis in Vietnam

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Concerted control measures have considerably reduced the burden of malaria in Vietnam, and the parasites that cause it are now mostly restricted to forested rural areas. The high risk of malaria infection associated with subsistence activity in forests is a well-known and widely reported phenomenon in Southeast Asia. This phenomenon is commonly referred to as 'forest malaria'. The transmission of *P. knowlesi* from monkeys to humans contributes an additional complication to our understanding of forest malaria. However, zoonotic malaria by *P. knowlesi* infection in those areas was unclear. In order to determine whether *P. knowlesi* is infecting the human population of the Khanh Phu Commune, Khanh Vinh District, Khanh Hoa Province, we collected mosquito and human blood samples from the commune, and analyzed these for the presence of malaria parasites using PCR. In analysis of sporozoite positive salivary glands, *P. knowlesi* was detected in 42 salivary glands, which was the same detection number as *P. falciparum* in the samples. Mixed infection with *P. knowlesi* and human malaria parasites was detected in 27 samples, 19 were mixed with *P. vivax,* one with *P. falciparum*, and 7 with *P. vivax* and *P. falciparum*. The results suggest that *Anopheles dirus* harbors *P. knowlesi* in a considerably high rate, and bites monkeys as frequently as humans. In the analysis of human blood samples, *P. knowlesi* was detected in 45 out of 170 blood samples with malaria parasites. All *P. knowlesi* parasites were found in mixed infections with other human malaria parasites. Gametocytes of *P. falciparum* and *P. vivax*, moreover, were detected by RT-PCR analysis but that of *P. knowlesi* was not detected. These results indicate that natural human infection of *P. knowlesi* is prevalent in this area. In this study, we were not able to determine whether *P. knowlesi* is being transmitted from human to human although transmission from monkey to humans via mosquitoes seems highly likely.